Unit 1
Projection of Planes

Prerequisite/Recapitulations

- Drawing, Sketching
- First angle & third angle projection
- Basics of engineering graphics
- Projection of Point
- Projection of Straight Lines

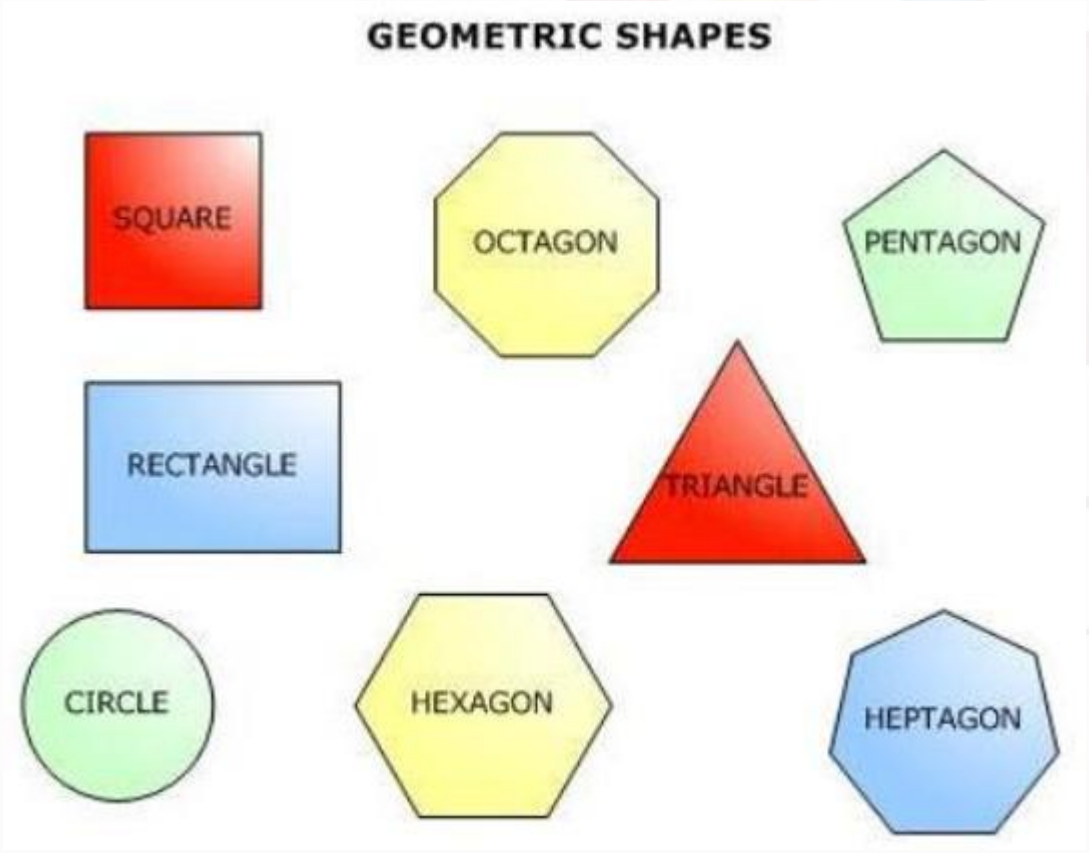
Learning objectives

To acquire knowledge about:

- Different cases of Projection of planes

Types of Planes

- Two dimensional objects are called planes.
- They have length, breadth and negligible thickness



Types of Planes contd.

There are two types of Planes:

1. Perpendicular planes: Divided into sub-types:

(i) Perpendicular to both the reference planes.

(ii) Perpendicular to one plane and parallel to the other.

(iii) Perpendicular to one plane and incline to the other.

2. Oblique planes which have their surface inclined to both the reference planes.

Projection of Planes

In this topic various plane figures are the objects.

What is usually asked in the problem:

To draw their projections, means F.V, T.V & S.V

What will be given in the problem:

1. Description of the plane figure.
2. 2. It’s position with HP and VP.

In which manner it’s position with H.P. & V.P. will be described:

1. Inclination of it’s SURFACE with one of the reference planes will be given.

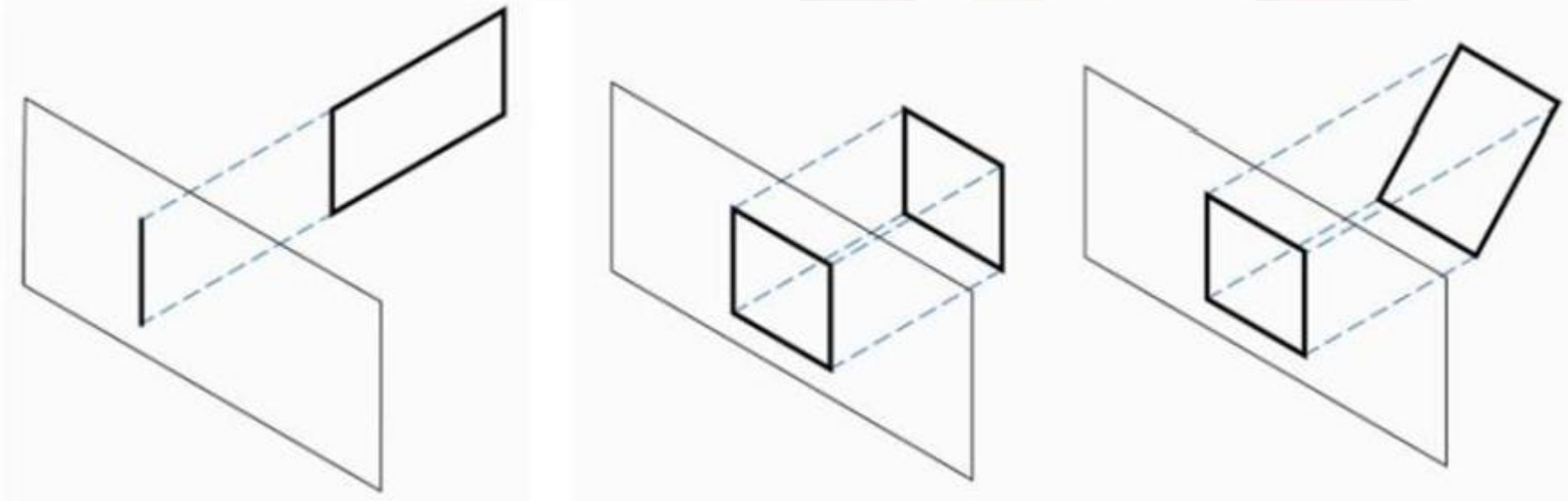
2. Inclination of one of it’s EDGES with other reference plane will be given .

Orientation of Planes

a) Perpendicular (Edge view)

b) Parallel (True shape and size)

c) Inclines (Foreshortened shape)



a) Perpendicular b) Parallel c) Inclines

Different problems for Projection of Planes

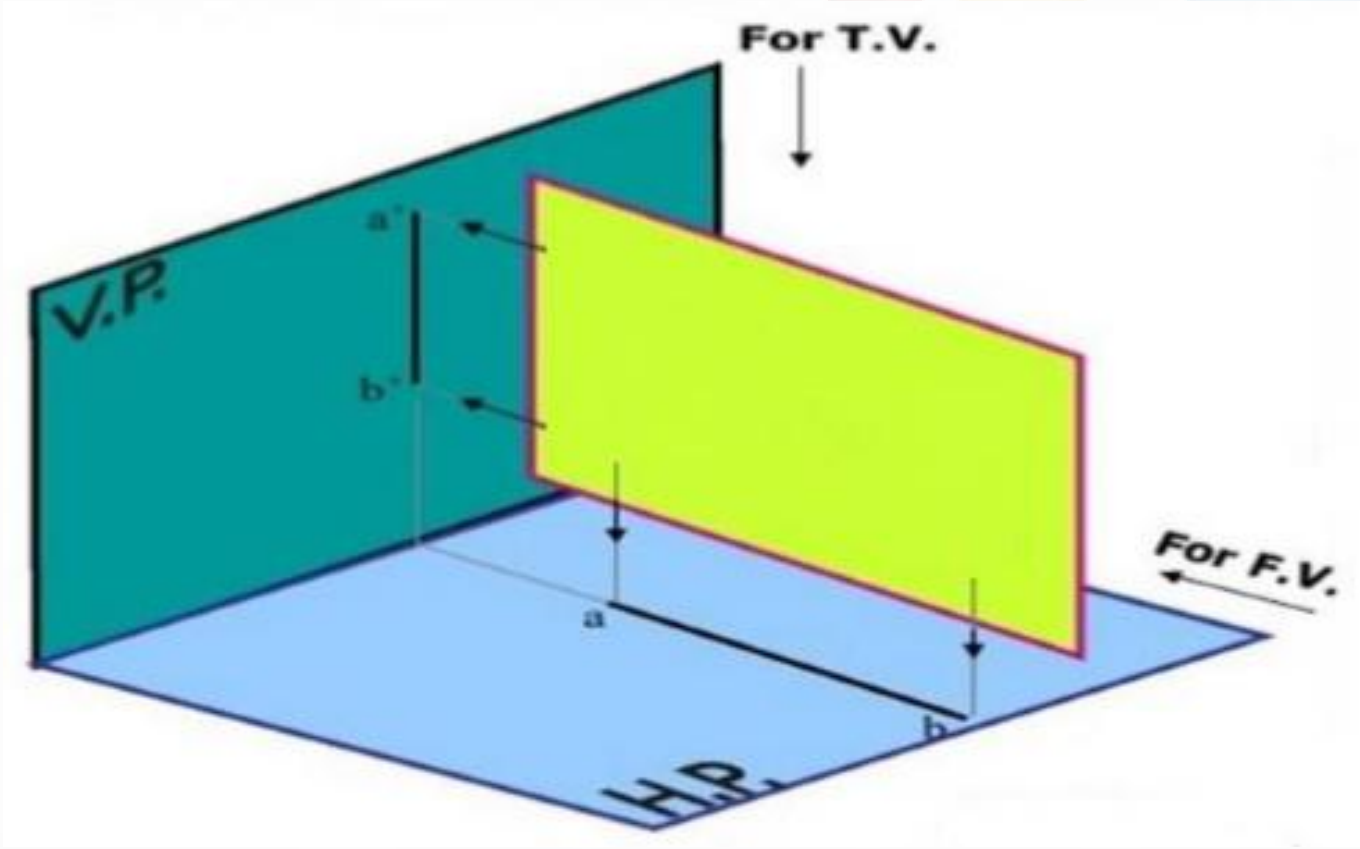
a) Surface perpendicular to both HP and VP

b) Surface parallel to HP and perpendicular to VP

c) Surface inclined to HP and perpendicular to VP

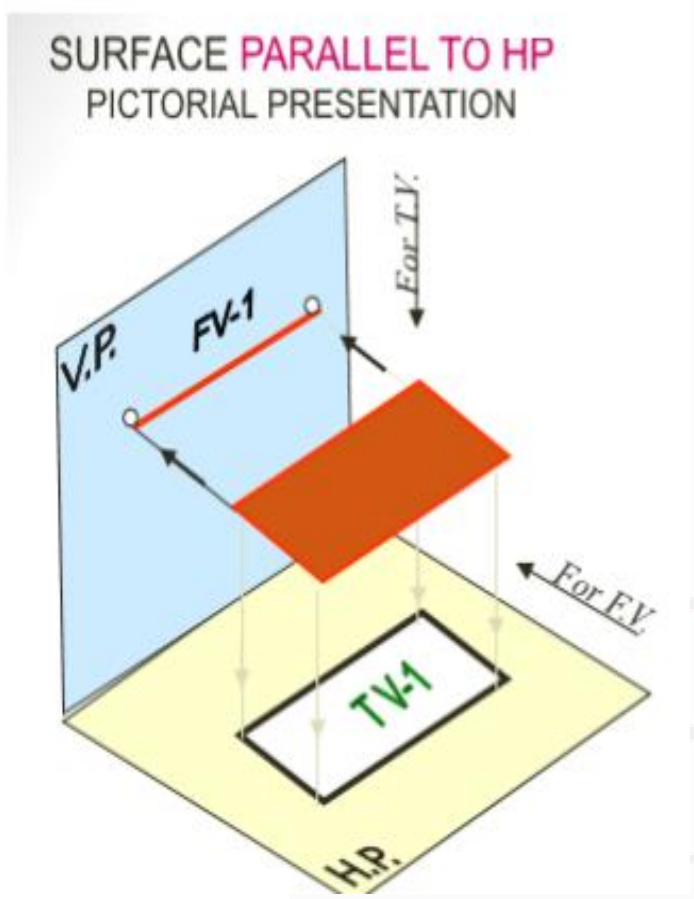
PROJECTION OF DIFFERENT TYPES OF PLANES

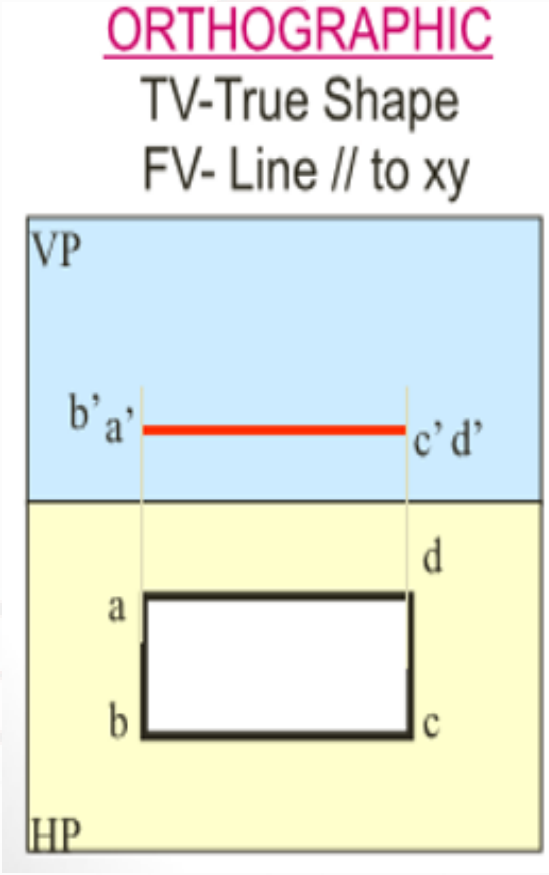
A. Plane PERPENDICULAR to both the reference planes:
Front View (F.V.) and Top View (T.V.) are both lines



PROJECTION OF DIFFERENT TYPES OF PLANES

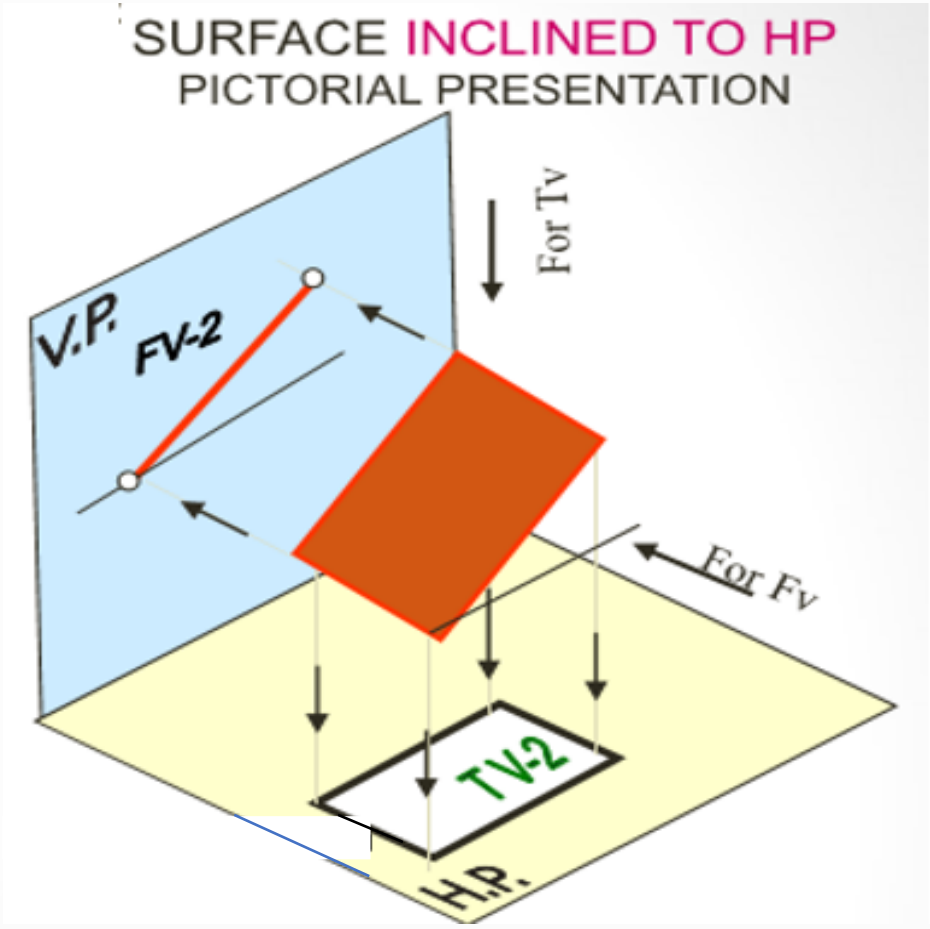
B. Plane PERPENDICULAR to one plane and PARALLEL to other reference planes:

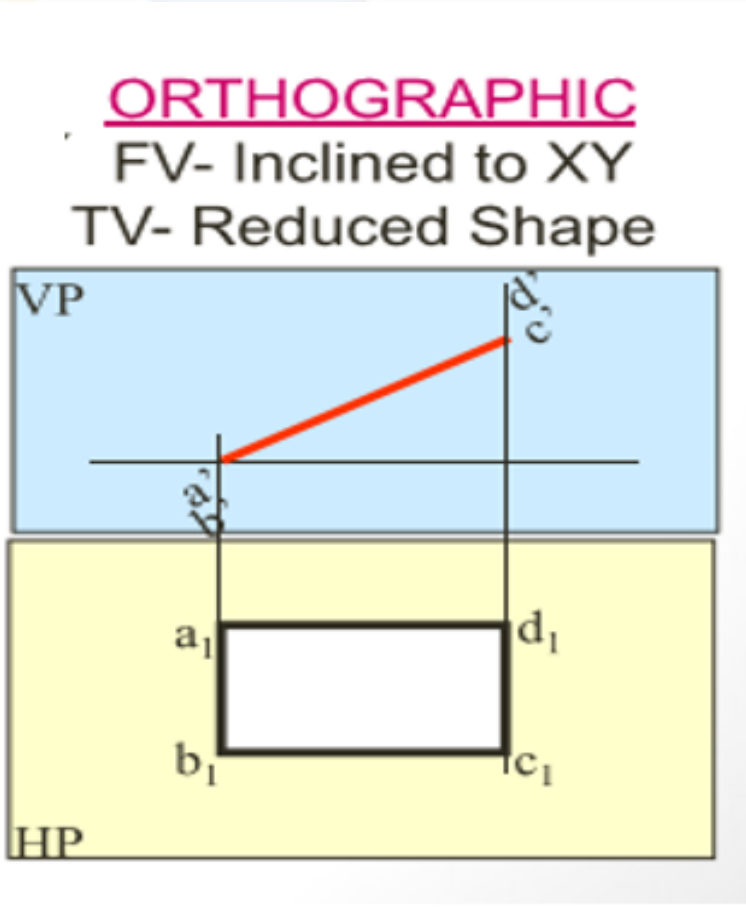




PROJECTION OF DIFFERENT TYPES OF PLANES

C. Plane PERPENDICULAR to V.P. and Inclined to H.P.:





The projection of INCLINED PLANE is drawn in two stages

In the initial stage, the plane is assumed to be parallel to that reference plane to which it has been made inclined. It is then tilted to required inclination in the second stage.

(a) Plane, inclined to H.P. and perpendicular to V.P.:

- It is assumed to be parallel to H.P. and perpendicular to V.P.

T.V. will show the true shape and F.V. will be a line parallel to XY

- F.V. is then tilted to the required inclination with XY
- T.V. is then obtained by moving the corners along their respective paths (parallel to XY) and perpendicular to XY from the view which is a line.

T.V. will show a reduced shape and F.V. will be a line tilted to XY

The projection of INCLINED PLANE is drawn in two stages Contd.

b. Plane, inclined to V.P. and perpendicular to H.P.:

It is assumed to be parallel to V.P. and perpendicular to H.P.

F.V. will show the true shape and T.V. will be a line parallel to XY

T.V. is then tilted to the required inclination with XY

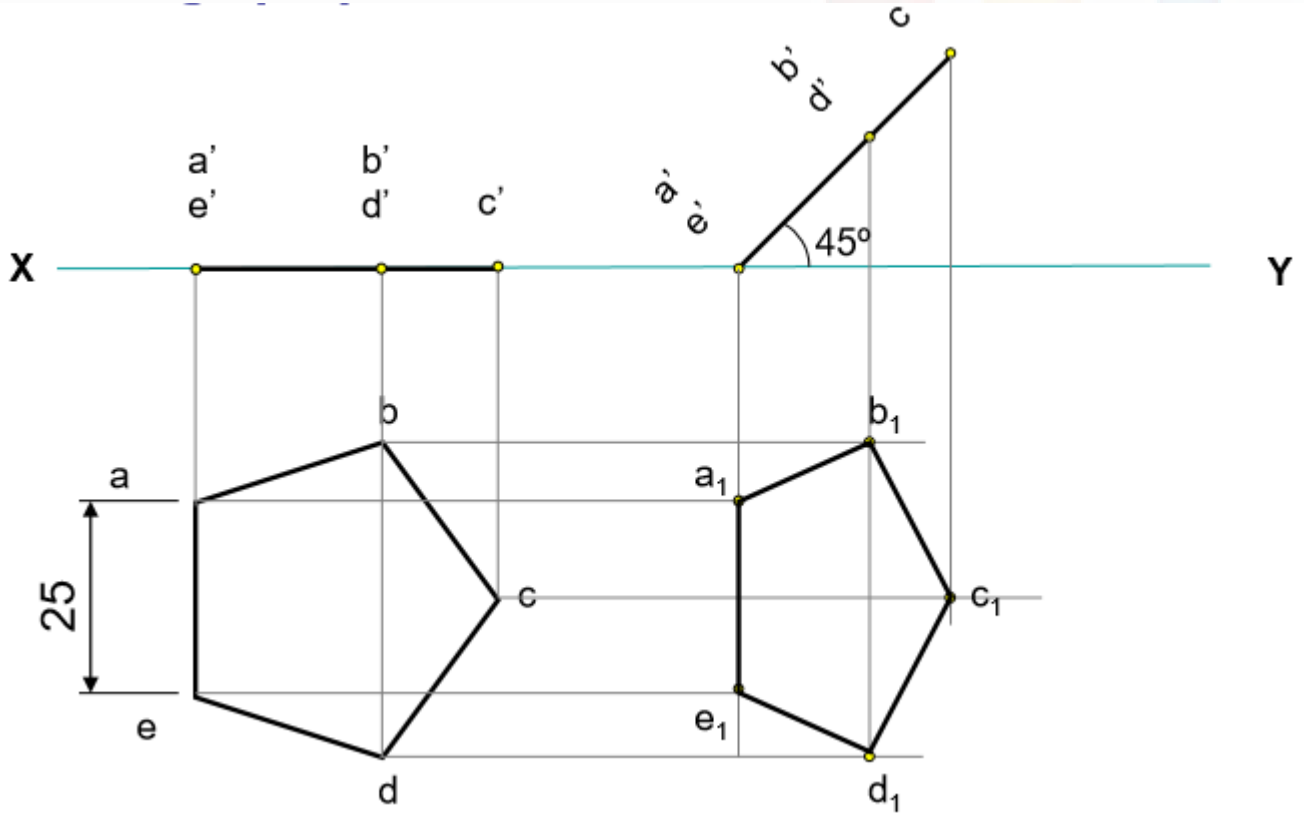
F.V. is then obtained by moving the corners along their respective paths (parallel to XY) and perpendicular to XY from the view which is a line (T.V.).

F.V. will show a reduced shape and T.V. will be a line tilted to XY

PROJECTION OF DIFFERENT TYPES OF PLANES

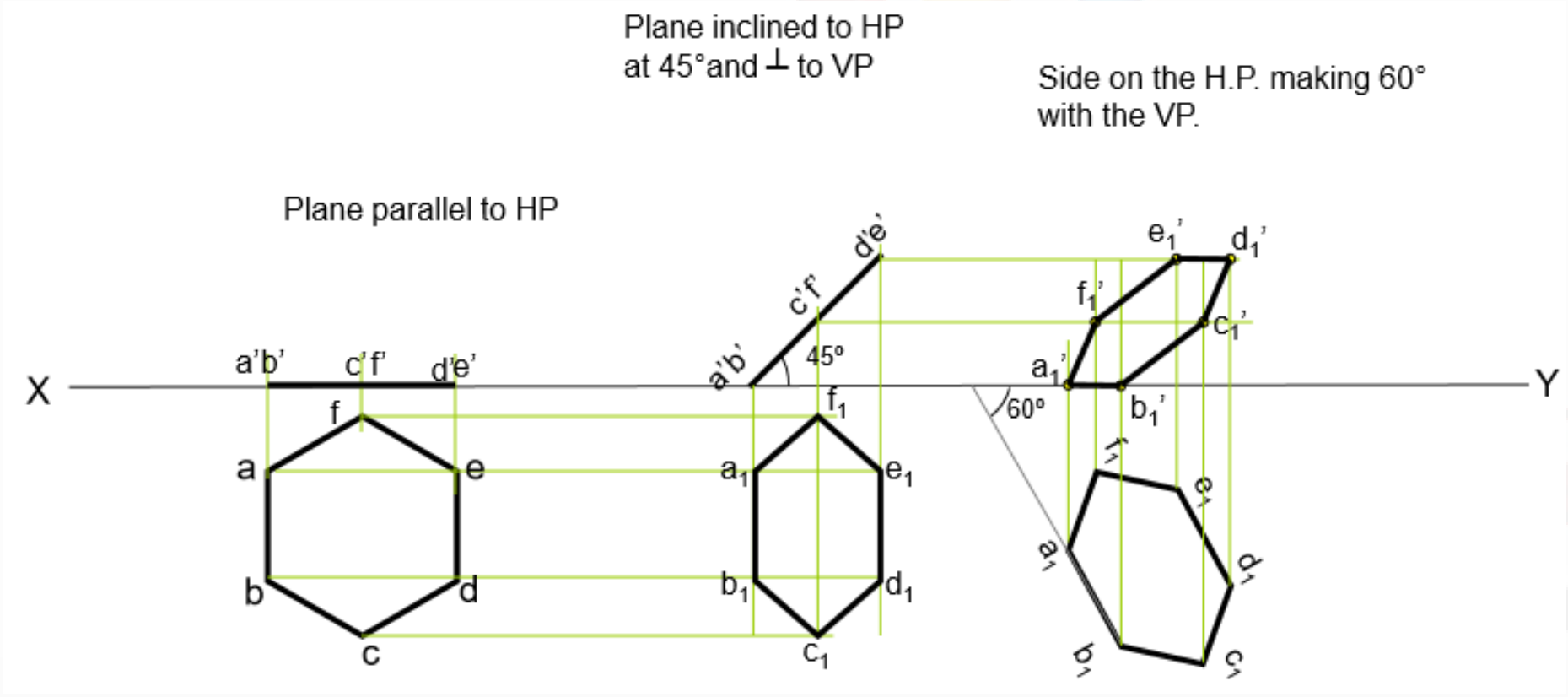
Example: A regular pentagon of 25mm side has one side on the ground. Its plane is inclined at 45º to the HP and perpendicular to the VP. Draw its projections

Hint: As the plane is inclined to HP, it should be kept parallel to HP with one edge perpendicular to VP



PROJECTION OF DIFFERENT TYPES OF PLANES

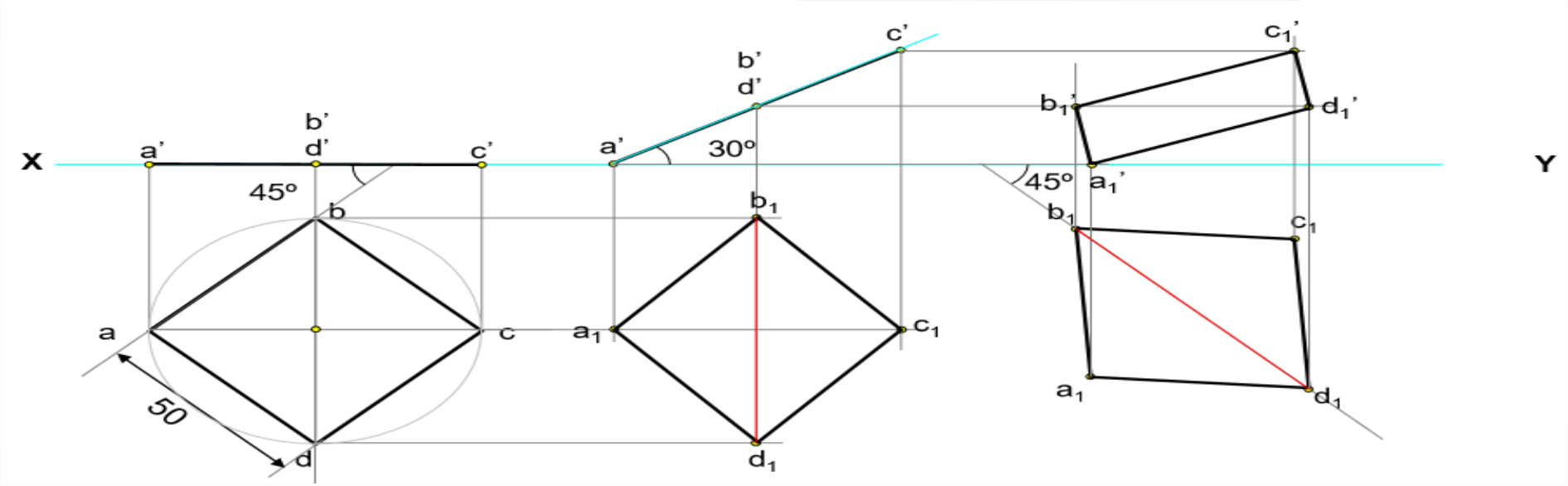
PROBLEM 2: Draw the projections of a regular hexagon of 25mm sides, having one of its side in the H.P. and inclined at 60 to the V.P. and its surface making an angle of 45º with the H.P.



PROJECTION OF DIFFERENT TYPES OF PLANES

PROBLEM 3: A square ABCD of 50 mm side has its corner A in the H.P., its diagonal AC inclined at 30º to the H.P. and the diagonal BD inclined at 45º to the V.P. and parallel to the H.P. Draw its projections.

- Keep AC parallel to the H.P. & BD perpendicular to V.P. (considering inclination of AC as inclination of the plane)
- Incline AC at 30º to the H.P. i.e. incline the edge view (FV) at 30º to the HP
- Incline BD at 45º to the V.P.



Summary

Learners are able to draw:

a) Surface perpendicular to both HP and VP

b) Surface parallel to HP and perpendicular to VP

c) Surface inclined to HP and perpendicular to VP

d) Surface inclined to VP and perpendicular to HP

Questions

❖ **Problem 1:** A 30 – 60 degree set square of longest side 100 mm long, is in VP and 30 degree inclined to HP while it's surface is 45 deg. inclined to VP. Draw it's projections.

❖ **Problem 2:** A 30 – 60 degree set square of longest side 100 mm long is in VP and it's surface 45 deg. inclined to VP. One end of longest side is 10 mm and other end is 35 mm above HP. Draw it's projections.

❖ **Problem 3:** A regular pentagon of 30 mm sides is resting on HP on one of it's sides with it's surface 45 deg. inclined to HP. Draw it's projections when the side in HP makes 30 deg. angle with VP.

❖ **Problem 4:** A regular pentagon of 30 mm sides is resting on HP on one of it's sides while it's opposite vertex (corner) is 30 mm above HP. Draw projections when side in HP is 30 deg. inclined to VP.

References

- Engineering Drawing by N. D. Bhatt and V. M. Panchal
- Engineering Graphics by K. C. John
- NPTEL

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Thank You